

Chapter 11

The Ship's Bridge

Introduction

In this chapter you will learn about the ship's bridge, where the Quartermaster spends most of his or her time. We will put together much of what you have learned previously in this book plus new topics.

The ship's bridge is where all orders concerning the actions of the ship are issued. While under way the officer of the deck (OOD) directs every action. As Quartermaster of the watch (QMOW), you will be an assistant to the OOD. You are responsible for knowing not only your duties but also those of all bridge watchstanders and the operation of all bridge equipment. In the last section of this chapter, the duties of the QMOW will be described for each watch stood throughout the a day at sea.

Objectives

This material in this chapter will enable the student to:

- Identify steering control consoles components.
- Steer the ship from the bridge.
- Steer the ship from after steering.
- Steer the ship during special evolutions.
- Describe the effects of wind and current on the ship.
- Rig and verify combinations of navigational lights.
- Describe the components of tactical messages.
- Identify flags and pennants.
- Encode and decode tactical signals.
- Operate ship's radars.
- Prepare commanding officer's night orders.
- Maintain Ship's Deck Log.
- Determine and plot the ship's position .
- Maintain logbooks.
- Maintain the DR track.
- Maintain a plot in support of weapons.
- Determine ship's position in relation to PIM.
- Compute estimated time of arrival.
- Determine set and drift and make recommendations to the OOD.
- Time celestial observations.
- Provide input for ship's position reports.
- Render honors and ceremonies.
- Report visual contacts.

Objectives, Continued

Objectives

- Make recommendations based on Rules of the Road.
 - Read flaghoist display.
 - Set up the bridge for special evolutions.
 - Describe the duties of QMOW while at anchor.
 - Dress and full dress the ship.
 - Hold morning and evening colors.
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Bridge Equipment

Introduction

As you might imagine, there are many pieces of equipment on any ship's bridge. Each ship class has installed equipment to enable that ship to do its job. It would be almost impossible to describe each and every piece of equipment that would be found on the bridge of a ship. However, equipment that is normally found on all bridges will be covered. As a QMOW, you are responsible for knowing how to operate all equipment located on the bridge of the ship to which you are assigned. This may seem to be a large tasking; however, as you complete PQS for different watch stations on the bridge, you will gain the required knowledge to operate the bridge equipment for your ship.

Steering Control Consoles (SCC)

The ship's control console contains apparatuses for controlling the movements of a ship. Figures 11-1, 11-2, and 11-3 show three types of ship control consoles in use aboard ships today. As you can see from these figures, the ship control console's physical appearance may differ from ship type to ship type. On ships that have a ship control console like those shown in figures 11-1 and 11-2, the helmsman must also complete PQS for ship control console operator. On the bridge of older ships, like the one shown in figure 11-3, the helm, engine order telegraph, rudder angle indicator, and steering gyro repeaters are all located in the near vicinity of the helmsman, but at different locations on the bridge.

On newer ships, the ship control console houses all the apparatuses for steering the ship and for controlling its speed in one compact unit. Additionally, on some ship consoles, like the one shown in figure 11-2, you will find lighting, steering, and general alarm controls housed in the ship control console.

Helm Unit: The helm unit for most ships consists of a wheel, rudder angle indicator, rudder order angle indicator, and synchros that send electrical impulses to the steering units located in the after steering room.

Lee Helm: The lee helm unit may be located in the SCC or it may stand alone near the SCC. In any case, it sends information to the engine room to indicate the ship's speed. In general, a speed order is sent from the bridge and then the order is answered by the engine room.

Bridge Equipment, Continued

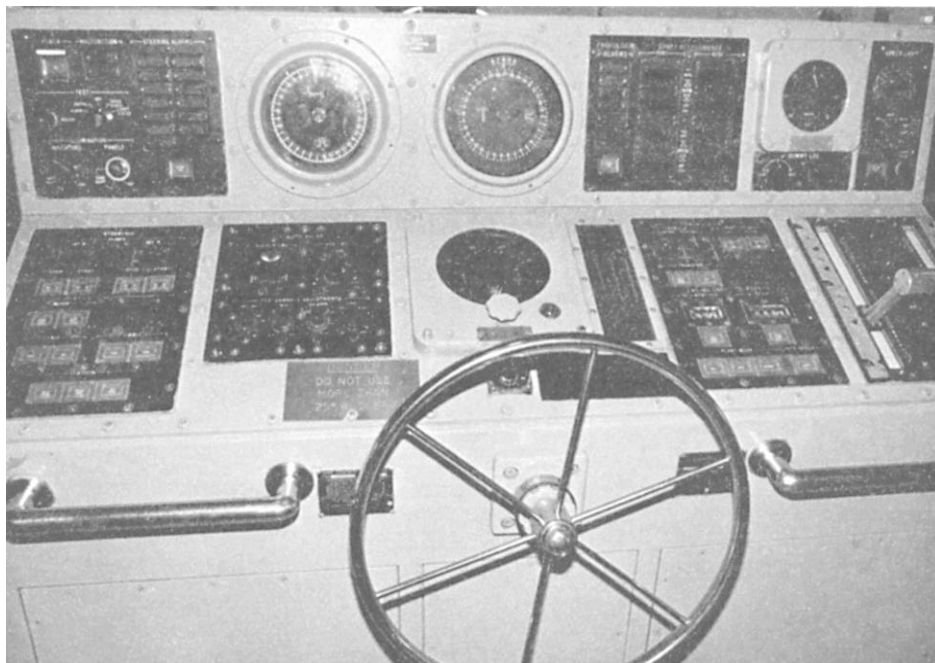


Figure 11-1. DD 963 class ship control console.

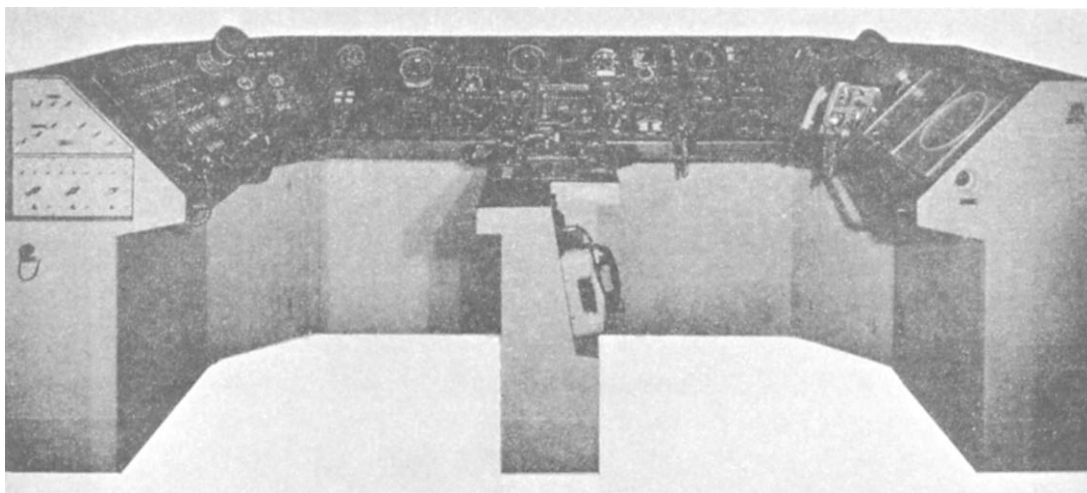


Figure 11-2. FFG-7 class ship control console.

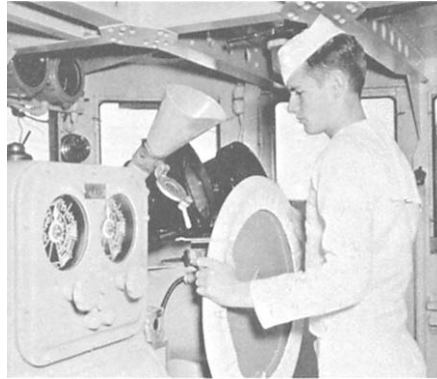
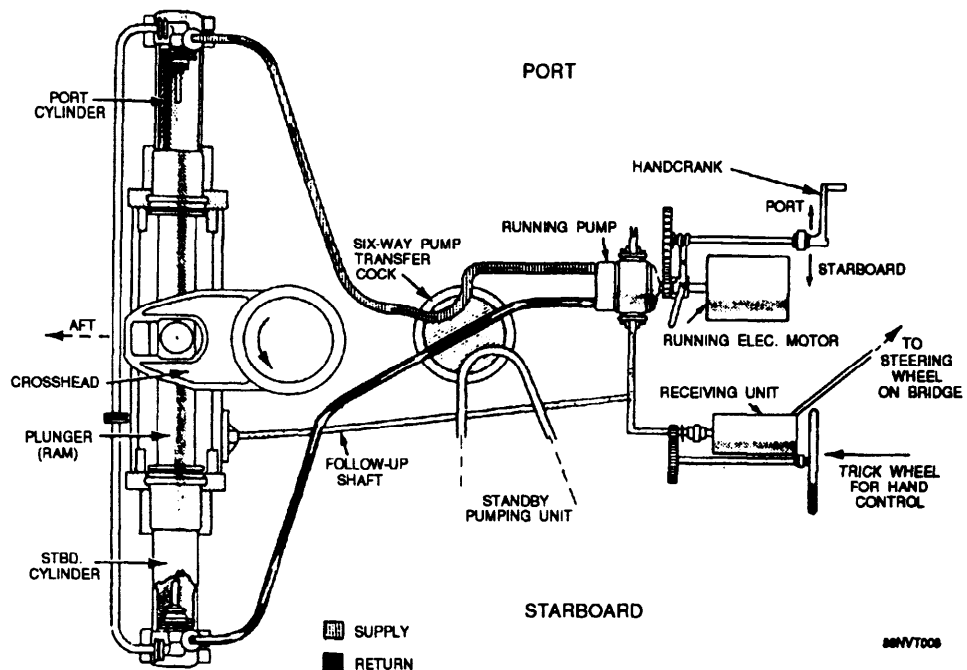


Figure 11-3. Bridge of a destroyer, showing voice tube in front of helmsman..

Steering Pumps: Most ships are equipped with a minimum of four steering pumps located in the after steering room. The normal configuration for running are pumps one and three or pumps two and four. The pump units are run at 24-hour intervals and normally switched on the midwatch. The controls for the steering pumps may be located in the SCC. Figure 11-4 shows the port steering gear assembly.



11-4. Port steering gear.

Bridge Equipment, Continued

Gyrocompass Repeaters: As you learned in chapter 2, there are several gyro repeaters located on the bridge. In the SCC, there are normally two such repeaters for the helmsman to steer the ship by. One is called the master and receives its signal from the master gyrocompasses. The other is called the auxiliary and it receives its signal from the auxiliary gyrocompass. Also, the magnetic compass is generally located directly behind the SCC where the helmsman can steer by it, if necessary.

Shifting Steering Control: In emergency situations, steering control may be shifted to after steering or the secondary conning station. As a rule, whenever the ship is in restricted waters or conducting underway replenishment, after steering will be manned by a master helmsman and helm safety officer. If the helm unit on the bridge were to fail, the helmsman could immediately shift steering control to after steering. Step-by-step instructions for shifting steering control vary from ship to ship. The engineering officer should be consulted for instructions.

SCC Alarms: There are several alarms that are located in or near the SCC. Among these, the two most important are the loss of steering alarm and the gyrocompass failure alarm. If either one activates, the OOD should be notified immediately.

Ship's Characteristics

Fundamentals of Shiphandling Before we can discuss the techniques used to steer a ship, you'll have to learn the basics of shiphandling. Use the following table and figure 11-5 to learn the terms associated with a ship's characteristics.

Term	Definition
Pivot Point	<p>A ship's pivot point is a point on the centerline about which the ship turns when the rudder is put over. The pivot point scribes the ship's turning circle.</p> <p>A ship's pivot point is nearly always located about one-third the ship's length from her bow when moving ahead, and at or near her stern when moving astern. The location of the pivot point will vary with ship's speed. An increase in speed will shift the pivot point in the direction of the ship's movement.</p>
Turning Circle	<p>A ship's turning circle is the path followed by the ship's pivot point when making a 360 degree turn. The diameter of the turning circle varies with rudder angle and speed. With constant rudder angle, an increase in speed results in an increased turning circle. Very low speed (those approaching bare steerageway) also increases the turning circle because of reduced rudder effect.</p> <p>Knowledge of the turning characteristics of one's ship is essential to safe shiphandling, particularly when in restricted waters.</p>
Advance	Advance is the amount of distance run on the original course until the ship steadies on the new course. Advance is measured from the point where the rudder is first put over.
Transfer	Transfer is the amount of distance gained towards the new course.
Tactical Diameter	Tactical diameter is the distance gained to the left or right of the original course after a turn of 180° is completed.
Final Diameter	Final diameter is the distance perpendicular to the original course measured from the 180° point through 360°. If the ship continued to turn at the same speed and rudder indefinitely, it would turn on this circle. The final diameter is almost always less than the tactical diameter.

Ship's Characteristics, Continued

Term	Definition																																										
Standard Tactical Diameter	Standard tactical diameter is the specific distance recorded in tactical publications for each ship. It varies with each ship class.																																										
Standard Rudder	Standard rudder is the amount of rudder angle used to make the ship turn in the standard tactical diameter. On most ships, this is equal to 15°.																																										
Angle of Turn	<p>Angle of turn is the angle measured from the point where the rudder was put over to the point where the ship steadies on the new course.</p> <p>For example, if a ship is on course 300° and turns starboard to new course 345°, the angle of turn is 45°.</p> <p>Using Turn Bearing: Finding the angle of a turn is necessary for using turn bearings. A turn bearing is a bearing from an ATON on which the ship will put the rudder over to execute a turn. Every ship maintains a tactical characteristics folder, which contains advance and transfer tables as shown in table 11-1. Advance and Transfer tables are used to determine turn bearings. They are entered using the angle of turn and the ship's speed.</p> <p>Actual construction of turn bearings will be covered in chapter 12.</p> <table><tr><th colspan="3">STANDARD TACTICAL DIAMETER AT 15 KNOTS REQUIRING STANDARD RUDDER</th></tr><tr><th>Angle of turn (degrees)</th><th>Advance (yards)</th><th>Transfer (yards)</th></tr><tr><td>15</td><td>185</td><td>40</td></tr><tr><td>30</td><td>275</td><td>85</td></tr><tr><td>45</td><td>345</td><td>115</td></tr><tr><td>60</td><td>390</td><td>190</td></tr><tr><td>75</td><td>445</td><td>270</td></tr><tr><td>90</td><td>500</td><td>375</td></tr><tr><td>105</td><td>450</td><td>445</td></tr><tr><td>120</td><td>405</td><td>520</td></tr><tr><td>135</td><td>360</td><td>590</td></tr><tr><td>150</td><td>315</td><td>655</td></tr><tr><td>165</td><td>265</td><td>725</td></tr><tr><td>180</td><td>205</td><td>800</td></tr></table> <p>26NVM113</p> <p>Table 11-1. Sample from Advance and Transfer Tables.</p>	STANDARD TACTICAL DIAMETER AT 15 KNOTS REQUIRING STANDARD RUDDER			Angle of turn (degrees)	Advance (yards)	Transfer (yards)	15	185	40	30	275	85	45	345	115	60	390	190	75	445	270	90	500	375	105	450	445	120	405	520	135	360	590	150	315	655	165	265	725	180	205	800
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Drift Angle	Drift angle is an angle at any point on the turning circle between the intersection of the tangent at that point and the ship's keel line.																																										
Kick	Kick is the swirl of water toward the inside of the turn when the rudder is put over. Also, the momentary movement of the ship's stern toward the side opposite the direction of the turn.																																										

Ship's Characteristics, Continued

Discussion

When the rudder is put over in making a turn, the stem is forced away from the direction of the turn. Because of momentum, the ship turns very slowly from her original course for several lengths. She then commences to gain ground in the new direction, moving sideways through the water to a considerable degree. This naturally results in loss of speed and is why, when a column turn is made, a vessel gains rapidly on the ship ahead while that ship is turning, but loses this distance during her own turn when the first ship completes her turn and steadies on the new course.

Each ship should have available on the bridge a folder of the ship's tactical characteristics. It should be carefully studied by all shiphandlers. Pertinent data should also be available at other stations concerned with ship maneuvers, such as the combat information center (CIC).

These tables are drawn up with the ship making several turning runs at different speeds and using various rudder angles.

Table 11-1 is a sample advance and transfer table for a ship making a turn at 15 knots, using standard rudder. Similar tables are compiled for other rudder angles at the same and different speeds. The time required to make the various turns may also be shown.

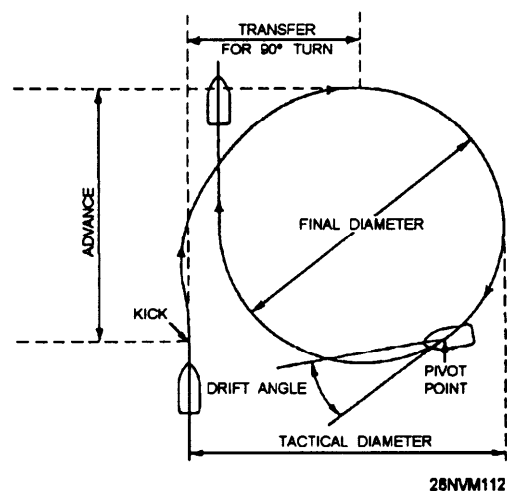


Figure 11-5. Turning circle.

Acceleration and Deceleration Tables

At times, allowance must be made for the rate at which a ship increases and decreases speed. Another part of the tactical data folder, therefore, is the acceleration/deceleration table, of which a sample is given in table 11-2. Practical examples of its use follow.

Example 1: A ship is standing up a channel at 15 knots. The captain desires to maintain speed as long as possible, but must pass an anchored dredge at a maximum speed of 10 knots. Determine how far before reaching the dredge a speed reduction should be commenced.

Ship's Characteristics, Continued

Acceleration and Deceleration Tables

From the deceleration table, it is determined that 1 minute is required to decelerate from 15 knots to 10 knots. Because the rate of deceleration is always constant between any two speeds, the average of these two speeds is the average speed of the ship during this time period. By computation, 15 knots plus 10 knots gives an average speed, during 1 minute of deceleration, of 12 1/2 knots. Determination of average speed is the crux of this problem. To compute the distance the ship will travel in 1 minute at 12 1/2 knots, multiply 2,000 (yards) by 12.5 (knots) and divide by 60 (minutes). The result is approximately 417 (yards). Measure back 417 yards along the DR track from a point abeam the dredge. This latter point is where it is recommended that turns for 10 knots be rung up on the engines.

Example 2: A ship is proceeding through Ambrose channel at 10 knots. The navigator is informed that 25 knots is to be ordered when the ship clears the channel. One computation is requested by the OOD:

- How far along the DR track will the ship travel from the time 25 knots is rung up until she is making that speed?

- Because the ship is proceeding at only 10 knots, a running tabulation of speeds and times must be considered. Going to the acceleration part of the table, compute the distance traveled in three steps: 10 to 15, 15 to 20, and 20 to 25.

Knots		Minutes		Rate
Change of speed		Time required for change	Total elapsed time	Knots per minute
From	To			

Acceleration

0	10	3	3	3-1/3
10	15	2	5	2-1/2
15	20	2	7	2-1/2
20	25	5	12	1
25	30	10	22	1/2

Deceleration

30	25	5	5	1
25	20	3	8	1-2/3
20	15	1	9	5
15	10	1	10	5
10	0	2	12	5

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Table 11-2. Sample Acceleration and Deceleration Table

Steering the Ship

Helmsman and Master Helmsman

In normal steaming conditions, the helmsman is normally a nonrated Seaman from the Deck Department. However, only QMs qualified as master helmsman man the helm during situations where precise shiphandling is required (unrep, restricted waters, and special evolution). Keeping a ship exactly on course can be a tough job, especially in heavy seas. As you advance to higher paygrades, you will be required to complete PQS and stand watch as helmsman and master helmsman.

The following discussion will cover standard orders to the helm, effects of wind and current, and steering the ship for special evolutions.

Note: Conning officers are usually assigned from the ranks of junior officers. Increasingly, senior QMs are tasked with standing watch as conning officer and even OOD on smaller ships. The study of shiphandling theory is highly encouraged. A excellent reference is *Crenshaw's Naval Shiphandling*.

Standard Helm Orders

Rules:

- The courses the helmsman steers must be ordered by the conning officer. The helmsman should have the ship on course before he or she surrenders the wheel to his or her relief. This does not apply to master helmsman.
- The words *port* and *starboard* are never used when giving orders to the helmsman. When an order necessitates a change of rudder angle to right or left, the direction of change is always stated, such as **right** full rudder.
- The helmsman always repeats all orders back to the conning officer, as they were given (word for word). Standard orders to the helmsman and their corresponding meanings are as follows:

Helm Order	Action
RIGHT (LEFT) STANDARD RUDDER	Varies on different ships (usually 15° rudder). It is the designated number of degrees of rudder angle that causes the ship to turn within a prescribed distance called standard tactical diameter. You must find out what standard rudder is on your ship.
RIGHT (LEFT) FULL RUDDER	Usually means 30° on the rudder angle indicator.

Steering the Ship, Continued

Helm Order	Action
RIGHT (LEFT) HARD RUDDER	Normally equal to 35° of rudder.
COME RIGHT (LEFT) TO 148°	Means to swing the ship's head in the direction stated and steady it on the course given; in this example, 148°. The order is frequently stated "COME RIGHT (LEFT) TO 148°."
STEER 190°	Usually given for only a minor change of heading to the number of degrees specified.
STEADY ON 225°	States the course on which the ship's head is to be steadied. It is normally given while ship's head is swinging. You may use up to 30° of opposite rudder to steady the ship.
INCREASE YOUR RUDDER	Means to increase the rudder angle and is usually ordered when the conning officer wants the ship to move more rapidly. May be given as a specific amount such as increasing to right full rudder.
EASE YOUR RUDDER TO (SPECIFIED) DEGREES	Signified to reduce the rudder angle. It may be given as "EASE TO 15° (10° 20° RUDDER" or "EASE YOUR RUDDER TO RIGHT 15)."
RUDDER AMIDSHIPS	Means to put the rudder on the centerline; no rudder angle. As a rule, this order is merely "RUDDER AMIDSHIPS!"
MEET HER	Means to check the swing by putting on opposite rudder.
STEADY AS YOU GO	Means to steady the ship on the course it is heading at the time the order is given. If the ship is swinging at the time, heading must be noted and the lubber's line brought back to and steadied on it as soon as possible. The order is also stated as "STEADY," or "STEADY AS SHE GOES."
SHIFT YOUR RUDDER	Commands you to change to the same number of degrees of opposite rudder angle.
MIND YOUR RUDDER!	A warning that the ship is going off the course because of bad steering.
NOTHING TO THE RIGHT (LEFT) OF (SPECIFIED HEADING)	Given when the presence of some danger on one side or the other makes it necessary to avoid a set in that direction.
KEEP HER SO	Continue to steer the course you are heading. Usually given after you state the course you are steering.
MARK YOUR HEAD	A statement to the helmsman. He or she should give the ship's head at the time of the command, for example, "two seven five, sir."
VERY WELL	Reply of conning officer to helmsman, meaning that the response is understood.

Steering the Ship, Continued

Techniques

The helmsman must repeat distinctly, word for word, every order he or she receives. This is done so the conning officer knows the helmsman understands his or her command. To respond to an order such as STEADY AS YOU GO, follow the repeating of the order with the reply STEADY ON 110, or whatever the course was you marked when you received the order. Do this once the ship steadies up.

As a master helmsman, you must know more about how your ship steers than anyone else. Every ship handles differently. Many hours on the helm will allow you to anticipate how the ship will react. Here are some tips, which were gathered from senior Quartermasters concerning steering the ship.

General Techniques: The first rule that you must follow is to pay attention at all times! Many helmsmen have found themselves in a world of trouble because they lost focus, and then chased the helm. This is how ships become damaged (which the U.S. Navy frowns upon).

Never oversteer. Steering a ship is often a situation where less is more. Always use the least amount of rudder necessary to maintain course. Be patient, the ship will respond. A common mistake is to use more rudder than needed to maintain course, which results in a snaking effect.

On the other hand, use the rudder when needed. Commands like MEET HER and STEADY AS YOU GO warrant the use of rudder up to 30°, if necessary. Other ships in formation judge another ship by the way she makes her turns. Make sure your ship turns smartly. Quick and precise maneuvers are the name of the game!

Find the weather helm: If you were to leave the rudder amidships (0°), the wind, current, and even the ship's list would put you off course. Before relieving the helm, make a habit of observing the swell and wind waves. Then, always ask what rudder combinations are currently being used to maintain course. For example, if the wind and swell is hitting the ship on the port bow at 45°, the stem will be pushed to the right. This action could cause the ship to fall off course to the left. Knowing this, you could imagine that some amount of right rudder will be required to maintain course. When finding the weather helm, you are actually looking for the amount of rudder that is a real time 0°.

The weather helm varies with the weather and currents. If it takes a constant 2° of right rudder, then the weather helm equals 2° right, which is the same as 0° with no wind or current.

Steering the Ship, Continued

During UNREP	<p>Steering the ship during underway replenishment is no simple task. There are more factors to consider other than wind and current. When two ships are alongside, a vortex effect is created. This vortex works like a cushion between the two ships, normally pushing them apart slightly. Also, when the rigs are tensioned, the ships are pulled together slightly.</p> <p>Close attention to keeping the ship exactly on course cannot be stressed enough. Use the least amount of rudder to accomplish this. Often, the master helmsman will be required to steer courses on 0.5 degrees such as 010.5. While unreping .5° is the maximum deviation allowed from ordered course. Also, ships alongside often make turns while rigs are hooked up. This requires the ship on the outside of the turn to slightly increase speed. This type of maneuver is normally completed in 5-degree increments until the final course is reached.</p> <p>Prior to beginning a UNREP, the bridge watch team should go over emergency procedures for loss of steering.</p>
In Restricted Waters	<p>Steering the ship in restricted waters requires precise shiphandling. As with UNREP evolutions, every effort must be made to stay exactly on ordered course. Often the ship will be transiting narrow channels where tidal currents may be strong. This is not much of a problem when the bow is pointed into the current; however, a strong current from astern can cause the bow to fall off course. This is especially true when the ship's speed is 10 knots or less.</p>
During Special Evolutions	<p>Special evolutions include general quarters, launching of amphibious craft, or whenever the OOD or navigator requires that the more experienced master helmsman man the helm.</p>
From After Steering	<p>Steering the ship from after steering requires total concentration. This is due mainly to the fact that there is nothing to see and the trick wheels used to move the rudders face towards the stem. If steering control is lost on the bridge, steering control will be shifted to the after steering helmsman. The after steering helmsman will receive orders directly from the conning officer (relayed by the helm safety officer) or from the rudder angle order indicator.</p>

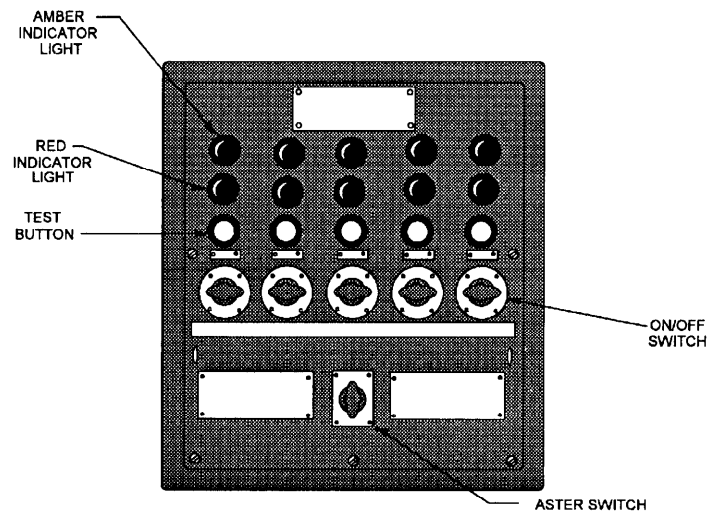
Navigational Lights

Rules of the Road

According to the Rules of the Road, every ship is required to display navigational lights. The Quartermaster is responsible for turning on the ship's running lights at sunset and during periods of reduced visibility and for turning them off at sunrise.

Navigational Light Panel

The ship's running lights consist of the forward mast light, the after mast light, the port and starboard side lights, and the stem light. A typical running light control panel is shown in figure 11-6. Before turning these lights on, you should test each light by pressing the test button with all power switches on. Above the test button there are two indicator lights. Each running light has a primary and a secondary filament. When you are testing the lights and a red indicator light comes on, this means the primary filament is burned out, and the light should be replaced by an Electrician's Mate. Under most conditions, you should turn on all of the light switches, leaving the master switch off. When you are ready to energize the lights at sunset, turn on the master switch and all the ship's running lights are energized at the same time.



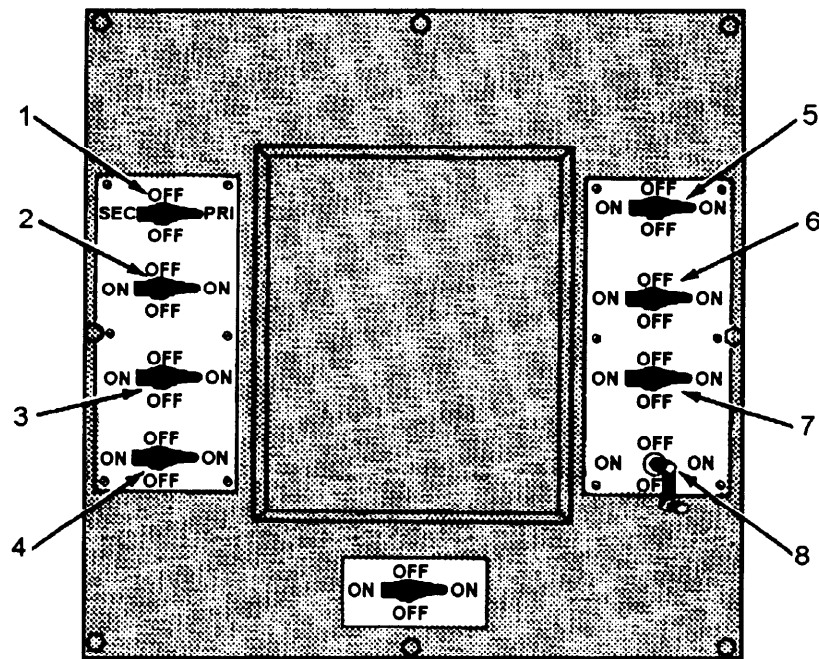
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Figure 11-6. Running light control panel.

Special Lighting Control Panel

In addition to being familiar with the normal running light control panel, the Quartermaster must also be familiar with the operating of the special lighting control panel. A description of the lights on the special lighting control panel follows. Refer to figure 11-7.

Navigational Lights, Continued



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Figure 11-7. Special light control panel.

NOTE: The panel position of the switches for the various lights may vary by ship type.

Name	Description	Energized When
1. Wake Light	The wake light (white) for ships is installed on the fantail or afterpart of the ship to illuminate the wake. It is mounted so that no part of the ship is illuminated. The fixture is watertight and of tubular construction. The wake light, like the running lights, has a two-filament bulb with a primary and secondary switch position on the control panel.	Engaged in towing operations or whenever the wake needs to be illuminated.

Navigational Lights, Continued

Name	Description	Energized When
2. Blinker	The blinker lights are located on the yardarms and are used for sending flashing light. The blinker lights are used with signal keys, which are normally installed on the bridge and signal bridge. The blinker light switch must be in the ON position for the signal key to be activated.	Used as an alternative method of sending flashing light at night.
3. Aircraft Warning	The aircraft warning lights are 360° red lights. They are installed at the truck of each mast that extends more than 8 meters (26 feet) above the highest point of the superstructure. Two aircraft warning lights are installed if the one light cannot be seen throughout 360°. If two masts are tall enough to require these lights but are less than 15 meters apart, they will be installed only on the higher mast.	From sunset to sunrise when your ship is at anchor or moored. When operating aircraft at night.
4. Not Under Command/ Man Overboard	The crank/switch controls a pair of red lights that have multiple uses. The lights are located 6 feet apart (vertically) and mounted on brackets that extend abaft the mast or structure and to port thereof. This mounting arrangement permits visibility, as far as practicable, throughout the 360° arc.	<u>Not Under Command</u> --When the switch is in the ON position, it turns on the red lights, which indicate that your ship has had a breakdown. <u>Man Overboard</u> --When the switch is continually turned ON and OFF by use of the crank, it causes the pair of red lights to blink ON and OFF (pulsate), indicating that your ship has a man overboard.

Navigational Lights, Continued

Name	Description	Energized When
5. Task	The proper light signal to let other ships know that your ship cannot easily maneuver is red-white-red. If you turn on the lights as you would to indicate that your ship is broken down and add a white light in the center, this will give you the proper lights. The required white light is mounted in the center of the <u>Not Under Command/Man Overboard</u> lights, and the controlling switch is mounted on the bulkhead in the vicinity near the special lighting control panel.	Whenever the ship is in a situation where it cannot easily maneuver. For example, when a ship is alongside another ship taking on food, fuel, or ammo, it is involved in a task and cannot maneuver easily. Also used when a ship is constrained by its draft.
6. Blue Stem	The blue stem light is a light similar to the white stem light the ship uses for normal running lights.	Your ship is engaged in convoy or formation steaming during periods of darken ship. It is also used when engaged in some forms of plane guard duty during recovery/launch flight operations.
7. Anchor Aft	The after-anchor light is a 360° white light mounted at the top of the flagstaff.	From sunset to sunrise and during periods of reduced visibility when your ship is at anchor or moored.
8. Anchor Forward	The forward anchor light is a 360° white light mounted at the top of the jackstaff. It is used at the same time as the after-anchor light.	Same as above.
Not Shown: ASW Light [Grimes light)	The ASW light is a colored light, visible as nearly as practical, all around the horizon. Each ship is provided with two red, two green, and two amber lenses. The ASW light is installed on all ASW-capable ships. The color to be used is determined by the squadron commander. The ASW light is installed on either the yardarm or mast platform where it can be seen all around the horizon.	Conducting ASW operations.

External Communications

Methods

There are several ways by which to communicate with other ships and shore commands while at sea. One of the oldest is communicating by flaghoist using signal flags. The newest methods incorporate the use of satellite uplinks to transfer data. The objective of the material presented in this section is to give you a basic knowledge of methods of communicating. You will be referred to reference material for instructions concerning each method.

The following table gives you a snapshot of different methods used to communicate while at sea.

Method	Description
VHF Radio (Electronic)	The VHF radio commonly refer to as the bridge-to-bridge circuit is often used to exchange unclassified information between ships. All vessels over 100 meters in length are required to be equipped with VI-IF capability.
Radiotelephone (R/T) (Electronic)	When conducting operations, the RT circuits are probably the most frequently used method of communicating. Each ship involved is assigned a call sign. There are normally at least two secure frequencies assigned for any operation by the officer in tactical command (OTC). One frequency is used for encoded tactical signals, while the other is used for secure plain voice communications.
Flaghoist (Visual)	<p>Tactical and information signals are communicated using signal flags. The flags and pennants are divided into two flag bags. The allied bag contains 68 flags and pennants that are used to communicate with other naval ships. The international flag bag contains 40 flags and pennants that are used to communicate with merchant ships.</p> <p>Flaghoists are always read from the top outboard side then down and inward. In other words, if three hoists are closed up (at the top of the halyard) start at the top outboard side and read down, then go to the top of the next inner hoist and again read down, and so on.</p> <p>Signalmen make up and execute flaghoist messages or signals as directed by the OOD.</p>

External Communications, Continued

Method	Description
Flashing Light	Searchlights equipped with special shutters and red lenses are used at night to send messages or signals. Standard Morse code is transmitted to the receiving ship by Signalmen
Semaphore	Semaphore is much faster than flashing light when transmitting messages over a short distance. It is normally used while ships are alongside conducting UNREP. Signalmen send the messages using hand flags or light wands.

Responsibilities As you continue to advance as a QM, you will be required to gain experience in the use of the methods of external communication as listed. As a PO2 or PO3, you are required to be able to read signal flags and pennants. As step-by-step instructions are given in ACP 129, *Communication Instructions, Visual Signalling Procedures*, they will not be repeated here.

At the PO1 and higher paygrades, you are required to encode and decode tactical signals. Instructions to meet this requirement are found in ATP, *Allied Tactical Publication 1B*, Volumes I and II. OJT is really the only way to become proficient at encoding, decoding, and transmitting tactical signals. The navigator can normally set up training through the operations boss on this material.

Exchanging Navigational Data

Occasions will arise when the exchange of navigational data with other ships is necessary. In general terms, a position, time of position, and course and speed are all that is required. Navigational data must never be exchanged on unsecured frequencies. Always notify the navigator when an exchange of navigational data is requested.

Bridge Watch Personnel

The numbers and assignments of personnel on watch vary from ship to ship, depending on the ship's size and availability of personnel.

The watch on the bridge, under way, normally consists of the following personnel:

Officer of the deck (OOD)

Junior officer of the deck (JOOD)

Quartermaster of the watch (QMOW)

Boatswain's mate of the watch (BMOW)

Helmsman

Lee helmsman (who mans the engine order telegraph and RPM indicator)

Sound-powered telephone talker

Messenger

Lookouts

In the following text, we will discuss the duties of the OOD, BMOW, and helmsmen. The Quartermaster, as an assistant to the OOD, must know the duties of all bridge personnel.

Officer of the Deck

The officer of the deck under way is designated in writing by the commanding officer and is primarily responsible, under the commanding officer, for the safe and proper operation of the ship.

The following is a list of the OOD's primary duties as prescribed by the *Standard Organization and Regulations of the US Navy*, OPNAVINST 3120.32. The officer of the deck under way will:

1. Keep continually informed concerning the tactical situation and geographic factors that may affect the safe navigation of the ship, and take appropriate action to avoid the danger of grounding or collision according to tactical doctrine, the Rules of the Road, and the orders of the commanding officer or other proper authority.

Bridge Watch Personnel, Continued

Officer of the Deck, continued

2. Keep informed concerning current operation plans and orders, intentions of the OTC and the commanding officer, and such other matters as may pertain to ship or force operations.
3. Issue necessary orders to the helm and main engine control to avoid danger, to take or keep an assigned station, or to change the course and speed of the ship according to orders of proper authority.
4. Make all required reports to the commanding officer. When a command duty officer is specified for the watch, he or she will make the same reports to the command duty officer.
5. Ensure that required reports to the OOD concerning tests and inspections and the routine reports of patrols, watches, and lifeboat crews are promptly originated and that the bridge watch and lookouts are properly posted and alert.
6. Supervise and direct the personnel on watch on the bridge, ensure that all required entries are properly made in the Ship's Deck Log, and sign the log at the conclusion of the watch.
7. Issue orders for rendering honors to passing ships as required by regulations and custom.
8. Ensure that the executive officer, command duty officer (when assigned), and department heads concerned are kept informed of changes in the tactical situation, operation schedule, the approach of heavy weather, and other circumstances that would require a change in the ship's routine or other action on their part.
9. Keep informed of the status and current capabilities of the engineering plant and keep the engineering officer of the watch advised concerning boiler power requirements and the operational situation so that he or she may operate the engineering plant intelligently.

Bridge Watch Personnel, Continued

Officer of the Deck, continued

10. Carry out the routine of the ship as published in the plan of the day and other ship's directives, keeping the executive officer advised of any changes that may be necessary.
11. Supervise and control the use of the general announcing system; the general, chemical, collision, sonar, and steering casualty alarms; and the whistle according to the orders of the commanding officer, tactical doctrine, and the Rules of the Road.
12. Permit no person to go aloft on the masts or stacks or to work over the side except when wind and sea conditions will not expose him or her to danger; and then only when all applicable safety precautions are observed.
13. Supervise and control all transmissions and acknowledgments on the primary and secondary tactical voice radio circuits, and ensure that proper phraseology and procedures are used in all transmissions.
14. Supervise and conduct on-the-job training for the JOOW, the JOOD, and enlisted personnel of the bridge watch.
15. Assume such other responsibilities as may be assigned by the commanding officer.
16. Supervise the striking of the ship's bell to denote the hours and half-hours from reveille to taps, requesting permission of the commanding officer to strike eight bells at the hours of 0800, 1200, and 2000.
17. On ships that do not station a damage control watch officer, supervise the maintenance of a log of all fittings that are in violation of the material condition of readiness prescribed. Entries will show the name and rate of the person requesting permission to open a fitting, approximate length of time to be open, and time closed. Anyone who, without permission, violates the material condition of readiness in effect shall be made the subject of an official report.

As you can see from the list of duties, the OOD can be a very busy person. This is especially true when your ship is operating in company with other ships or close to a shipping lane. For this reason, you, as the Quartermaster of the watch, can be of great assistance to him or her. The QMOW is the direct assistant to the OOD.

Bridge Watch Personnel, Continued

**Junior Officer
of the Deck /
Conning Officer**

On many ships, the JOOD and conning officer watch stations are manned by one person. In this capacity the JOOD maintains a constant watch on all radar contacts along with CIC personnel. He or she receives reports on contacts from lookouts and gives orders to the helmsman and lee helmsman. The JOOD also encodes, decodes, transmits, and receives tactical signals and acts as an assistant to the OOD.

**Boatswains
Mate of the
Watch (BMOW)**

The BMOW is in charge of the underway watch section. The status of the BMOW in this respect is the same whether the ship is in condition of readiness I, II, or III, or the regular sea watch or in-port watch has been set.

The normal peacetime underway watch for which the BMOW is responsible consists of the helmsman, lee helmsman, messenger, lookouts, lifebuoy watch, and lifeboat crew of the watch. Besides being an enlisted assistant and executive arm of the OOD, the BMOW is the watch PO. It is the responsibility of the BMOW to make sure that all deck watch stations are manned and that all personnel in the previous watch are relieved. The BMOW makes a report to the OOD when the deck watch has been relieved.

The ship's organization and regulations manual shows the sea watch stations that must be manned and the divisions required to man them. From this, the BMOW knows which division section leader must be contacted if any person fails to report at his or her watch station.

Helmsman: The helmsman is responsible for keeping the ship on course as directed by the conning officer.

Lee Helmsman: The lee helmsman is responsible for operating the engine order telegraph (EOT) and relaying information between the bridge and main control.

Lookouts: There are normally three lookouts assigned to each watch section. One stationed on the port bridgewing, one on the starboard bridgewing, and one aft on the fantail. Each lookout is responsible for reporting any contacts or objects in the water to the OOD immediately. The aft lookout also watches the wake for personnel who may have fallen overboard.

Relieving the QMOW

Relieving the Watch

Always arrive on station ahead of the scheduled time for relieving the watch. There is nothing more unprofessional and aggravating than a late relief. More importantly, you must obtain much information about the general situation before you can assume the watch. The general pattern of relief is as follows:

One-half hour before the hour, the relief arrives on station. The relief will make inspection, read logs and turnover sheets, and obtain other information from watch standers. Fifteen minutes before the hour, watch standers are relieved.

When you relieve the watch, make sure you obtain all information the person you relieve may have for you. Such information includes verbal orders to the wheel that still are standing, steering peculiarities because of unusual weather situations, or anticipated aids to navigation.

When you arrive on the bridge, you must assess the general situation. You should have a good knowledge of what is happening aboard your ship. How much information you need depends to some degree on the situation your ship is in at the time. If you are in company with other ships, you will need much more information than you would if you were steaming independently. Never relieve the watch until you have been briefed on the ship's position and turning or rendezvous points. Additionally, you should sight all navigational aids (visual, radar, or other electronic means) that are being used to fix the ship's position.

Look over the Ship's Deck Log entries of the previous watch and see if there is anything pertaining to your watch. Report officially to the OOD that you have relieved the watch. As previously mentioned, you serve as the assistant to the OOD. In this capacity, you are very close to events occurring on the bridge and at other stations. Your nearness makes it possible for you to observe the watch personnel and the jobs they are performing. Frequently, the OOD is involved in a problem with maneuvering or navigation and may fail to notice the omission of small details in the ship's daily routine. The plan of the day or pages from the ship's organization book listing the routine of the day are available in the pilothouse. It is an important part of your job as QMOW to remind people concerned when the time approaches for performing each detail.

Commanding Officers Night Order Book

General Information

The navigator is also responsible for the preparation of the CO's night order book. Night orders are the captain's orders of how he or she wants the ship run when he or she is not on the bridge. The book is normally divided into two separate parts: standing orders and night orders.

Standing orders are the commanding officer's statement concerning his or her policies and directions under all circumstances. Night orders, written on a daily basis, are a summary of tactical, navigational, and readiness information for bridge watch standers. Additional information and guidance are added by the captain and the navigator.

Prior to writing the night orders, the navigator reviews the ship's operational orders and the nightly schedule of events for anticipated evolutions or activities. Should any conflicts exist between the schedule of events and the standing orders, the navigator informs the commanding officer.

The navigator then writes the night orders for the commanding officer, providing ship's information and operational data, including anticipated evolutions and a schedule of events, if needed. The commanding officer then adds his or her remarks and the night order book is placed on the bridge.

Among the watch standers required to read and initial are the OOD, JOOD, BMOW, and QMOW. This initialing ensures that the orders have been read and understood.

The Ship's Deck Log

Maintaining the Ship's Deck Log

As QMOW, one of your duties is to act as an observer and recorder. There are many logs and records that you must maintain. Probably the most important log will be the Ship's Deck Log. The basic requirements for maintaining the Ship's Deck Log are contained in U.S. Navy Regulations, 1973, and OPNAVINST 3120.32 series.

We will discuss the general policy and regulations, the form preparation, the assembly and disposition procedures, the abbreviations, and the required entries in the Ship's Deck Log.

General Policy and Regulations

All U.S. Navy ships in commission and other craft, as required, must maintain a Ship's Deck Log. The deck log is the official daily record of a ship by watches. Entries should describe every circumstance and occurrence of importance or interest that concerns the crew and the operation and safety of the ship. Entries should also include information that may be of historical value.

The deck log must be a chronological record of events occurring during the watch that will meet the needs of the commanding officer. Additionally, the deck log, will provide a document of historical, value. Accuracy in describing events recorded in a Ship's Deck Log is a must. Deck log entries often make important legal evidence that may be used in judicial and administrative fact finding proceedings arising from incidents involving the ship or its personnel.

Under certain circumstances, such as limited local operations of service craft, the maintenance of a deck log is not required. However, other adequate records of events must be maintained by the command. If doubt exists as to whether a deck log is required, the facts must be submitted to the Chief of Naval Operations (CNO) for a determination.

The Ship's Deck Log must be "unclassified" except when another classification is required by security regulations such as wartime operations, special operations, and so forth. Basically, information in the Ship's Deck Log is FOR OFFICIAL USE ONLY.

The Ship's Deck Log, Continued

Form Preparation

All ships must prepare an original and one copy of the deck log. The original log must be submitted monthly to the CNO for permanent retention. The copy must be retained on board for a period of 12 months, after which time it may be destroyed.

Sample entries should be used as guides for recording the remarks of a watch. Entries, such as reveille, meals for the crew, payday, and so forth, which would not serve any useful purpose or add to the historical value of the log, are not required.

All entries in the Ship's Deck Log must be made with a ballpoint pen, using black ink. The Quartermaster of the watch, or other designated watch personnel, must write the log of the watch legibly. Each event must be recorded at the time it happens or as directed by the OOD, who will supervise the keeping of the log .

Most ships normally adhere to a 4-hour watch schedule (00-04, 04-08, 08-12, and so on.), but note as follows: uniform time segments for the scheduling of watches are prescribed for the deck log. The remarks in the deck log must be recorded daily by watches that consistently adhere to the individual ship's schedule. The circumstances under which a ship is not required to make entries daily by watches can be found in OPNAVINST 3100.7.

The top of each form must be filled in as follows:

1. In spaces 3 and 4 (fig. 11-8), enter the first two letters of the ship type, and enter remaining letters, if any, in the next two shaded unnumbered spaces. In spaces 5 through 7, enter the ship's hull number. Use leading zero, as required. If the hull number consists of four digits, enter the first digit in the shaded unnumbered space.
2. In box 12, enter the last digit of the month; for example, 02 for February. In box 15, enter the letter designation for the time zone used to record time entries. In boxes 16 and 17, enter two digits for the day of the month.
3. In the space provided, enter the ship's position, latitude, and longitude at the hours of 0800, 1200, and 2000. This entry should be made each day during underway periods. Indicate the type of fix by entering that number from the legend to the right.

The Ship's Deck Log, Continued

SHIP'S DECK LOG SHEET											
OPNAV 3100/99 (Rev. 1-77) SN 0107-LF-031-0496											
USE BLACK INK TO FILL IN THIS FORM											
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>SHIP TYPE _____ HULL NUMBER _____</p> <p>D A FF 170</p> </div> <div style="width: 45%;"> <p>YEAR MONTH ZONE DAY</p> <p>10 1 Q 05 E</p> </div> </div>					USS UNDERWOOD AT/PASSAGE FROM NORFOLK, VA TO VA CAPS OP AREA						
					<div style="float: right; width: 100px; text-align: center;"> CLASS HANDL U 38 39 </div>						
POSITION ZONE TIME			POSITION ZONE TIME			POSITION ZONE TIME			LEGEND		
0800 L BY			1200 L BY			2000 L BY			1-CELESTIAL 2-ELECTRONIC 3-VISUAL 4-O.R.		
A BY			A BY			A BY					
RECORD OF ALL EVENTS OF THE DAY											
TIME	ORDER	CSE	SPD	DEPTH							
18-21	22-29	30-32	33-36	37-40	41						
<div style="text-align: right; margin-bottom: 10px;">00-04</div> <p>Assumed the watch. Passed pastiche to USS ROYAL (DD-000) at Encl. 3, further 2, lower. Operating Base, Norfolk, Virginia, with standard manning line/doubled. and springplay out for mid. aft. Receiving miscellaneous services from the pier. Cold is on and security watches have been posted. Material condition YAKE has been set throughout the ship. All present include various units of the US Atlantic Fleet. SOFA in Room SECOND PLOT embarked in USS PENNINGTON (AD). Security watch reports all conditions normal. Security watch reports all conditions normal. Properly relieved by LT JG W.J. TIGER. R. C. FOX, BTC, USN</p> <div style="text-align: right; margin-top: 10px;">04-08</div> <p>Assumed the watch. Passed as before. Security watch reports all conditions normal. Security watch reports all conditions normal. Properly relieved by LT N.A. TRAUT. W. D. Tiger W. J. TIGER, LTJG, USA</p> <div style="text-align: right; margin-top: 10px;">08-12</div> <p>Assumed the watch. Passed as before. Captain arrived and took d. Received fuel, water and draft reports. Draft fwd. 13' aft. 14' 7" stern 13' 9". Stationed the special ops detail. Properly relieved by LT E.D. SEADRAGON. N. A. Trout, LT, USN</p> <div style="text-align: right; margin-top: 10px;">08-12 (Continued)</div> <p>Assumed the watch. Captain and Navigator are on The Bridge.</p>											

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Figure 11-8. Sample of the Ship's Deck Log.

The Ship's Deck Log, Continued

Form Preparation

Make entries in the columns of the log as follows:

1. TIME: Enter the exact time of occurrence of event(s) being recorded.
2. ORDER: Enter the standard abbreviation (maximum of seven characters) for orders requiring course, speed, or depth changes. Standard abbreviations will be discussed later in this chapter. Orders consisting of more than seven characters are to be recorded in the EVENTS OF THE DAY column.
3. COURSE, SPEED, DEPTH: Enter the changes resulting from an ORDER. Example: after a rudder order and the ship is steady, the resulting course should be entered.
4. RECORD ALL EVENTS OF THE DAY: All entries in the Ship's Deck Log must be printed clearly and legibly. The remarks for each event must commence on the line entry of the time of the occurrence. When necessary, the remarks will be continued on succeeding lines. Ships, other than submarines, must start recording the events of the day in the DEPTH column.

Rewriting of the deck log sheets should not be required. When necessary, corrections to log entries must be accomplished according to the following procedures:

1. When a correction is deemed necessary, a single straight line must be drawn through the original entry so that the entry remains legible. The correct entry must then be inserted in such a manner as to ensure clarity and legibility. Corrections, additions, or changes must be made only by the individual required to sign the record for the watch and must be initialed by that individual in the left margin of the page.
2. When the commanding officer directs a change or addition to a log entry, the individual responsible for the watch must comply. If the individual responsible for that watch believes the change or addition to be incorrect, the commanding officer must enter the change or addition on the log over his or her own signature.

Only the OOD must sign the log following the last entry made during a watch. The name of the OOD must also be stamped or printed beneath the signature. Facsimile signatures are not acceptable.

The Ship's Deck Log, Continued

Deck Log Disposition

A Ship's Deck Log Title Page must be completed and attached to each original and duplicate monthly log. The front and reverse sides of each original log sheet may be used for either continuation of entries for a day or for commencing entries for a new day. Ships that are directed to prepare a duplicate copy for antisubmarine warfare (ASW) data must start a new page when the day or time changes

When a ship is directed to provide a duplicate copy of the log for specific ASW missions, two duplicate Ship's Deck Log sheets must be prepared in the following order:

1. The FIRST duplicate copy must be provided for ASW systems evaluation use.
2. The SECOND duplicate copy must be retained on board ship.

The navigator must examine the Ship's Deck Log daily and take such corrective action as may be necessary and within his or her authority to ensure it is properly kept. When each month's log is complete, the navigator must certify the correctness of its contents. This certification should be made in the space provided on the Ship's Deck Log Title Page. Daily signature of the navigator is not required.

The commanding officer must approve the log at the end of each month, when relieved of command, or when the ship is decommissioned. The commanding officer must signify approval by signing the Ship's Deck Log Title Page in the space provided. Both the original and duplicate logs must be signed. When a change of command occurs during the month, the log title page for that month must bear the signatures of each commanding officer. Additionally, the date of the change of command should be entered. The log must not be terminated for submission upon a change of command and must be submitted in its entirety at the end of the month.

Each month's log must be assembled beginning with the title page, followed by the deck log sheets. The deck log sheets should be unnumbered and in chronological order. The log pages for the month must be secured by round head paper fasteners or ribbon. Staples or other types of permanent binding must not be used.

The Ship's Deck Log, Continued

Assembly and Disposition

On the first day of each month or within 10 days thereafter, the original deck log for the previous month must be forwarded directly to the CNO. If required, the original deck log must be forwarded to the CNO by way of the administrative commander. Unclassified logs must be forwarded to the CNO by First Class Mail. Classified logs must be forwarded in the manner prescribed in OPNAVINST 5510.1F.

Ships on extended patrols or conducting special operations and unable to submit logs as required must do so within 10 days after reaching port.

The duplicate deck log provides a temporary record for shipboard use and for the reconstruction of events. It must be retained on board for a period of at least 12 months, after which time it may be destroyed.

When duplicate deck log sheets are required for ASW data use, instructions for those sheets should be provided by the directing commander.

When the original log or any portion of the log is withheld for any legal proceedings, the CNO must be notified. Specific guidelines for using the deck log in any legal matter can be found in the *Manual of the Judge Advocate General*, JAGINST 5800.7B.

Standard Abbreviations

There are several abbreviations that are allowed in the ship's deck log. Entries such as A/A/Full for all engines ahead full or R/AMID for rudder amidships are completely acceptable. The deck log instruction contains a complete list of frequently used abbreviations.

The Ship's Deck Log, Continued

Required Log Entries

As previously stated, events that serve no useful or historical purpose should not be logged. This statement is not meant to minimize deck log entries to the extent that an important event might be omitted. If there is any doubt as to whether or not an event should be logged, the best rule to follow is log it. You can always get guidance on the event in question at a later time. It is easier to delete an event than to add an event. The following is a partial list of required deck log entries. The complete listing of 31 required entries is contained in the deck log instruction and should be consulted when necessary.

1. Every injury, accident, or casualty, however slight, among the officers, crew, passengers, visitors, longshoremen, harbor workers, or repairmen on board must be recorded. The large number of claims for pension or other compensation submitted by persons alleging injury makes this information of great importance to the government. This information serves both to protect the government from false claims and to furnish a record for bona fide claims. Care must be taken to record the full particulars in each instance.
2. All peculiar or extraordinary appearances of the sea, atmosphere, or heavens, preceding or following sudden changes of wind, heavy squalls of wind, or of heavy gales.
3. All unusual appearances of the sea, tide rips, discolored water, extraordinary luminescence of the sea, strange birds or fish, icebergs, driftwood, seaweed, and so forth.
4. All unusual meteorological phenomena, extraordinary refractions, waterspouts, meteors, shooting stars, auroras, halos, fata morganas, iceblinks, corposantos, and all Earth satellites.
5. The behavior of the vessel under different circumstances of weather and sea, such as pitching, rolling, weathering qualities, and so forth.
6. The sighting of vessels, land lighthouses, lightships, and all dangers to navigation, with time, bearings, and distances.
7. The bearing and distance of the object taken for a departure.
8. Any sounding, the record of which is important with the character of the bottom.

General Duties of the QMOW

General Duties

You will spend many hours standing watch as QMOW on the bridge. Your duties are diverse and at times difficult; this is especially true when you are operating with other ships. In this section of the chapter we will begin to put together topics covered in other areas of the book. The overall goal is to show practical application of what you have learned and introduce you to a few new topics.

The general duties of the QMOW are:

- Maintaining the DR plot and updating the ship's position.
- Recording entries in the Ship's Deck Log.
- Observing and reporting the weather.
- Assisting the OOD.

Let's take a look at what is required of the QMOW.

Fixing the Ship's Position

The ship's position must be determined and plotted at regular intervals. Normally, the navigator determines the fix interval. The interval between fixes depends on the area in which the ship is operating. As the situation changes the navigator may change the fix interval.

For example, if the ship is scheduled to make an rendezvous with another ship in 4 hours, the fix interval may be changed from every hour to every 1/2 hour. The following table gives generally accepted fix intervals for routine situations.

Situation	Obtain a fix every
Open Ocean Navigating, no land within 50 nm.	hour
Open Ocean Navigating, land is within 50 nm, but not closer that 25 nm.	1/2 hour
Coastal Navigating, land is within 25 nn, but not closer that 10 nm.	15 minutes
Coastal Navigating, land is within 10 nm, but not closer that 5 nm.	10 minutes
Restricted Water, piloting	3 minutes

General Duties of the QMOW, Continued

Using All

Available Means to Determine Position

It is important to use all methods available to fix the ship's position.

The navigator is required by instruction to fix the ship's position by all available means. You as the QMOW must make every effort to accomplish this. In actual situations, you will often use a combination of methods to determine the ship's position. If transiting along a coastline and visual or radar fixes are available, use them! In the following list you'll find methods of fixing the ship's position listed by accuracy, from the most accurate to the least accurate:

- A visual fix on three objects 120° apart
- A visual fix on two objects 90° apart
- An electronic fix by GPS in the encrypted mode
- A visual bearing and radar range on one object
- A radar fix using three range arcs on objects 120° apart
- A radar fix using two range arcs on objects 90° apart
- An electronic fix by the AN/SRN 12 SATNAV
- An electronic fix by LORAN

Approaching Land

When approaching land from the open ocean, the QMOW must start checking to see if radar fixes can be obtained. At about 25 nm, the shoreline will start to become distinct. If sharp points of the shoreline are available, radar fixes should be obtained. Radar fixes are used in addition to whatever means are currently in place. In other words, if fixes were being determined by GPS, you would continue to plot GPS and also plot radar. As the ship progresses toward land, visual fixes would be added. This process continues until the ship enters restricted waters and the navigation detail takes over the watch.

During all of this activity, you must continue to maintain the DR plot. As you learned in chapter 8, the DR plot must never be neglected while you perform other tasks. In obtaining a fix, you are actually updating the DR plot. You'll find that as a ship draws closer to land, changing course often becomes necessary due to shipping traffic. This makes keeping your DR plot up to date even tougher. On the open ocean, the QMOW's ability is not taxed often; however, the watch becomes very busy when approaching land. Always make an effort to be prepared. Make sure that you have the next chart available and that your books and logs are up to date. If at any time, you are unsure of the ship's position, do not hesitate to contact your LPO or assistant navigator for guidance.

General Duties of the QMOW, Continued

Maintaining Logs

As you now know, maintaining the Ship's Deck Log is a big part of the QMOW's duties. You must also maintain the following records:

- Magnetic Compass Record Book
- Standard Bearing Book
- Weather observation sheets
- Passdown log

The Magnetic Compass Record Book must be filled in each time the ship changes course and on the hour and every 1/2 hour as explained in chapter 2. For example, if a ship changed course at 1947 an entry would be made. The next entry would be 2000 and 2030, and so on until the next course change. Gyrocompass error is entered in the remarks column each time it is computed.

The Standard Bearing Book is used to record bearing, range, and location of ATONs or radar points used to fix the ship's position, during piloting. Remember to enter the latitude and longitude of every ATON or radar point used to fix the ship's position beginning on the inside of the back cover or as directed by the navigator.

As you learned in chapter 10, weather observation must be made each hour whenever a ship is under way. You should begin your observations about 15 minutes before the hour. This allows you to completely record the observation data on the weather observation sheets prior to obtaining the hourly fix of the ship's position.

The passdown log is used to pass pertinent information down from watch to watch. Make sure to record any information passed down to you that concerns any aspect of the watch.

Plotting to support Weapons

During some operations, you may be required to maintain a plot in support of live firing exercises. Maps that use a grid system of coordinates are used to maintain the plot. This type of plotting requires specialized training involving both OSs and QMs and is scheduled by the Operations Department. The OSs maintain the manuals and instruction that give complete information on this topic.

General Duties of the QMOW, Continued

Making Reports to the OOD

After each fix, you are required to make reports of the ship's position to the OOD. When reporting, it is normal to report whether the ship is on track, the distance left or right of track, course and speed the ship is making good, any set and drift encountered, recommended course and speed changes, and estimated time of arrival at the next departure point (A, B, C, and so on) or rendezvous.

As you can see, there is quite a bit of information to report. To gather the required information, you will have to evaluate two or more fixes. This is a simple task that only takes a few minutes with a little practice. Let's break the evaluation down into sections, beginning with where the ship is in relation to track.

As you know, a ship steers a course to follow the track to its destination. The bow is actually always falling off left or right of course and then the helmsman uses the rudders to correct. This is due mainly to wind and current. Rarely does a fix fall exactly on the ship's track. To determine how far off track the ship has gotten, simply use the dividers to measure the distance left or right, 90° to the track, and jot down the results.

To find the course and speed made good since the last fix, use the parallel rulers and compass rose or PMP aligned on the last two fixes to find the course made good (CMG). Measure the distance between the last two fixes to find the speed made good (SMG). Remember from earlier chapters to use the time, speed, and distance triangle. Distance divided by time equals speed. Jot down your results. We now have two elements of our report. The next element to find is set and drift.

Set and Drift: What exactly is set and drift? Well, the term *set* means the direction in which the ship is being pushed off course. *Drift* is the speed or velocity that the ship is being pushed off course.

You will need recommended courses and speed changes to offset the effects of set and drift. In some cases, it may be necessary steer several degrees left or right of the desired course to make that course good. Once again, keep in mind that set and drift are directly related to the amount of wind and current. Let's work an example problem to find the value of set and drift.

General Duties of the QMOW, Continued

Example: The ordered course and speed is 080° at 10 knots. You have just plotted the 1000 fix, which shows the ship right of track. What is the set and drift? Refer to the following table and figure 11-8 to find set and drift.

Step	Action
1.	Find the CMG and SMG between the 0900 (A) and 1000 (C) fixes. You can see the CMG = 089 and SMG = 11.2 kn.
2.	Using a parallel ruler or PMP, find the direction between the 1000 DR (B) and the 1000 fix (C). As you can see, this equals 140°, the ship is being set in the direction of 140°
3.	Using dividers, measure the distance between the 1000 DR (B) and the 1000 fix (C). The distance is equal to 2.0 nmi.
4.	To find drift, divide the distance by the time between the two fixes. For our example the time between the two fixes is 1 hour. Drift equal 2.0/1.0 or 2.0 kn. Note: You may measure set and drift over many hours, if necessary. For example, if distance = 8.4 nmi, time = 7.5 hours what is the drift? $8.4 \div 7.5 = 1.12$; drift equals 1.12 knots

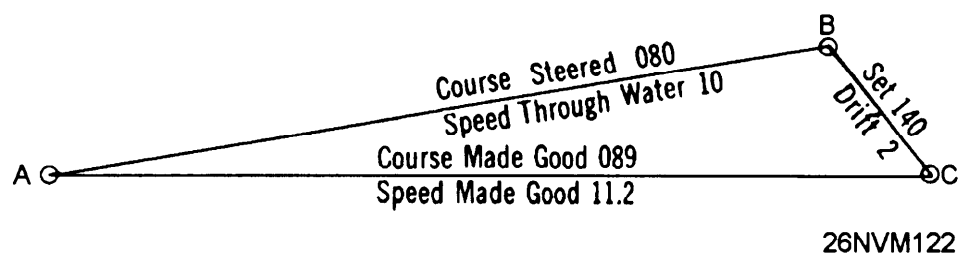


Figure 11-8. Finding set and drift.

General Duties of the QMOW, Continued

Allowing for Set and Drift: Once you have determined set and drift, you can allow for it to make your desired course and speed.

Example: Let's assume that you need to make course 265° and speed 15 knots good to arrive at the desired location on time. Set and drift are determined to be 185° at 3 knots. Use the following table and figure 11-9 for this example.

Step	Action
1.	From your latest fix (A), lay out course and speed to make good (B).
2.	From A, lay out a line in the set direction of 185° and the amount of drift of 3 knots (3 nmi), which gives you point C.
3.	Determine the course to steer by finding the direction between C and B. This is equal to 276° in our example
4.	Determine speed necessary to make 15 knots good by dividing the distance between C and B by the time of the run.

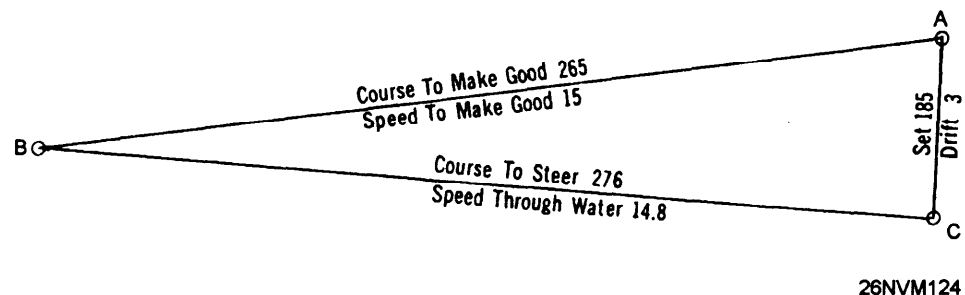


Figure 11-9. Allowing for estimated current.

Making Recommendations

You now have the knowledge to make recommendations to the OOD. Remember, after each fix you should make a report and any recommended course and speed changes required. Also, when maintaining the DR plot, always check to see that new courses ordered by the conning are clear of obstructions. The OOD will often have to maneuver the ship to avoid other ships.

General Duties of the QMOW, Continued

Ship's Position Reports

As prescribed by *Naval Regulations*, the navigator must report the ship's position to the commanding officer. These reports, called Ship's Position Reports, are prepared and submitted three times a day; 0800, 1200, and 2000. The report provides the commanding officer with the ship's current position, how it was determined, distance traveled since the last report, distance to the destination, and compass information.

The completed report is submitted to commanding officer about 5 to 10 minutes prior to the appointed hour. As the QMOW, you may be tasked with providing some of the information for the report. Normally you would begin the report about one-half hour prior to the appointed hour and fill in position and compass information only.

Observing Sunrise and Sunset

Another duty of the QMOW under way is to observe sunrise and sunset. The times of sunrise and sunset are normally determined for the entire transit prior to departing port. To observe sunrise, turn off running lights, report to the OOD, and make deck log entry when the Sun appears on the horizon. To observe sunset, energize and check for proper operation of all running lights, report to the OOD, and make deck log entry when the Sun disappears from the horizon.

Rendering Honors

As QMOW, you may be required to render honors to passing honors to U.S. Navy, Coast Guard, or foreign Navy ships. This applies to small boats carrying official parties also. The following table lists the procedure to be used to render honors. Complete information on honors and ceremonies can found in chapter 12 of *Naval Regulations* and BM TRAMANs.

Close aboard equals 600 yards for ships and 400 yards for boats.

Step	Action
1.	When close aboard with the bow of each ship about to pass, the junior vessel sounds the command ATTENTION TO PORT OR STARBOARD.
2.	When abreast, the junior vessel sounds the command HAND SALUTE.
3.	When the senior acknowledges the rendered honors, the junior vessel sounds the command CARRY ON.

General Duties of the QMOW, Continued

Reporting Contacts

While under way, it's the lookout's job to report visual contacts (other ships). Again, remembering that the QMOW is an assistant to the OOD, report any contacts that you observe.

Report a new contact to the OOD by relaying the following information about the vessel:

- Relative bearing
- Range in yards
- Type of vessel and class if possible (merchant, naval, DDG, and so on)

Making Recommendations Based on Rules of the Road

The OOD is thoroughly versed in the Rules of the Road; however, you may make recommendations concerning navigational light displays and prescribed sound signals required by the rules.

Special Evolutions

The bridge must be set up for all special evolutions. These include evolutions such as, general quarters, UNREP, entering restricted waters, and running a measured mile. As each ship is different, only general discussion will be provided.

In general, the QMOW with the assistance of the QM gang will set about getting the bridge ready for scheduled evolutions. Items like sound-powered phones, phone and distance lines, and light wands must be put in place and tested prior to the beginning of any evolution.

When preparing to run a measured mile, the navigation detail should be set.

General Duties of the QMOW, Continued

Duties While at Anchor

The rules for relieving the watch at anchor are the same as when under way except that night orders aren't signed. The OOD may be stationed on the bridge or at the quarterdeck. An anchor watch stationed on the forecastle reports how the anchor is tending and the amount of strain on the anchor chain.

Fixes are taken from available objects. A combination of visual and radar fixes are used when suitable lighted aids are unavailable. Fixes are normally taken on the hour and 1/2 hour. However, once again the navigator is responsible for determining the frequency of fixes. On many ships, fixes are taken every 15 minutes when winds of more than 30 knots are present. The anchor watch report is obtained at the time of each fix and reported to the OOD. You are also required to maintain a close watch of any shipping traffic in the area. If any ship anchors within 2,000 yards of your own ship, make a report to the OOD.

If, at any time, the ship plots outside of the drag circle or you suspect the anchor of dragging, immediately inform the OOD. You must begin fixing the ship's position continuously until directed to resume normal fixes by the CDO or navigator.

Radio Communications: You may be required to monitor R/T and VHF circuits. You should receive specific directions on which circuits you must guard. Always take appropriate action as required on any messages received over the circuits, and properly maintain the required logs.

QMOW in Port

While in port, your major responsibility is to hold morning and evening colors and turn on and off inport lights. To start the day, you observe sunrise and secure inport lights. At 0745, arrive on the bridge to execute morning colors. At precisely 0755, SOPA will hoist PREP at the Dip, you will announce over the 1 MC "FIRST CALL, FIRST CALL TO COLORS." At 0800 SOPA will close up PREP and sound one whistle blast over the one MC, you will do the same. After the National Anthem is finished playing, SOPA will haul down PREP and sound three whistles and once again you'll do the same. Immediately after evening colors is executed, turn on inport lights. The duty SM is responsible for posting PREP on your ship.

You may be tasked from time to time with gathering weather or navigational data for the CDO.